

WE CLAIM:

1. A method for defining quantitative measures in a computer system, comprising:
determining an increment quantity for a base unit of measure based on a conversion relation between the base unit of measure and an alternative unit of measure and based on a storage length provided for decimal quantities and a storage length provided for the conversion relation in the computer system;
if the increment quantity can be represented precisely within the storage length allocated for the conversion relation, adjusting the increment quantity and conversion relation by:
calculating an alternative increment quantity from the increment quantity and the storage length allocated for decimal quantities in the base unit of measure,
calculating an integer alternative quantity from the alternative increment quantity and the conversion relation, and
calculating an adjusted conversion relation from the alternative increment quantity and the integer alternative quantity; and
storing the adjusted conversion relation and the increment quantity for use in conversion of quantities from the based unit of measure and the alternative unit of measure.
2. The method of claim 1, further comprising, responsive to an input quantity expressed in the alternative unit of measure, converting the input quantity to a nearest corresponding increment quantity based on the adjusted conversion relation.
3. The method of claim 1, further comprising:
receiving input data at a computer system for quantities in the base unit of measure,
and
rounding the input data to nearest multiples of the increment quantity.
4. The method of claim 1, further comprising:
receiving input data at a computer system for quantities in the alternative unit of measure,
converting the input data to quantities in the base unit of measure according to the adjusted conversion relation,
rounding the converted input data to nearest multiples of the increment quantity, and

storing the rounded input data in memory.

5. A method for defining quantitative measures in a computer system, comprising:

determining an increment quantity for a base unit of measure based on a conversion relation between the base unit of measure and an alternative unit of measure and based on a storage length provided for decimal quantities and a storage length provided for the conversion relation in the computer system;

if the increment quantity that cannot be represented precisely within the storage length allocated for the conversion relation, adjusting the increment quantity and conversion relation by:

calculating a plurality of approximations for the increment quantity in the alternative unit of measure that can be represented within the storage length allocated for decimal quantities;

for each approximation:

adjusting the approximation according to a reference increment quantity,

calculating an adjusted conversion relation according to the adjusted approximation, and

determining a relative error between the conversion relation and the adjusted conversion relation; and

storing the adjusted conversion relation that is associated with the lowest relative error for use in conversion of quantities from the based unit of measure and the alternative unit of measure.

6. The method of claim 5, wherein the reference increment quantity is determined by calculating a least common multiple of a first quantity and a second quantity, wherein:

the first quantity is a quantity in the alternative unit of measure,

the second quantity is a quantity in a new alternative unit of measure, wherein the second quantity is derived from a second conversion relation between the alternative unit of measure and the new alternative unit of measure.

7. The method of claim 5, further comprising, responsive to an input quantity expressed in the alternative unit of measure, converting the input quantity to a nearest corresponding increment quantity based on the adjusted conversion relation.

8. The method of claim 5, further comprising:
receiving input data at a computer system for quantities in the base unit of measure,
and
rounding the input data to nearest multiples of the increment quantity.
9. The method of claim 5, further comprising:
receiving input data at a computer system for quantities in the alternative unit of measure,
converting the input data to quantities in the base unit of measure according to the adjusted conversion relation,
rounding the converted input data to nearest multiples of the increment quantity, and
storing the rounded input data in memory.
10. A computer readable medium, having program instructions stored thereon, that when executed, cause an executing device to:
determine an increment quantity for a base unit of measure based on a conversion relation between the base unit and an alternative unit of measure and based on a storage length provided for decimal quantities and a storage length provided for the conversion relation in the computer system;
if the increment quantity can be represented precisely within the storage length allocated for the conversion relation, adjust the increment quantity and conversion relation by:
calculate an alternative increment quantity from the increment quantity and the storage length allocated for decimal quantities in the base unit of measure,
calculate an integer alternative quantity from the alternative increment quantity and the conversion relation, and
calculate an adjusted conversion relation from the alternative increment quantity and the integer alternative quantity; and
store the adjusted conversion relation for use in conversion of quantities from the based unit of measure and the alternative unit of measure.
11. The method of claim 10, wherein the instructions further cause the executing device, in response to an input quantity expressed in the alternative unit of measure, to convert the input quantity to a nearest corresponding increment quantity based on the adjusted conversion relation.

12. The method of claim 10, wherein the instructions further cause the executing device to:
receive input data at a computer system for quantities in the base unit of measure, and
round the input data to nearest multiples of the increment quantity.
13. The method of claim 10, wherein the instructions further cause the executing device to:
receive input data at a computer system for quantities in the alternative unit of measure,
convert the input data to quantities in the base unit of measure according to the adjusted conversion relation,
round the converted input data to nearest multiples of the increment quantity, and
store the rounded input data in memory.
14. A computer readable medium, having program instructions stored thereon, that when executed, cause an executing device to:
determine an increment quantity for a base unit of measure based on a conversion relation between the base unit and an alternative unit of measure and based on a storage length allocated for decimal quantities and a storage length provided for the conversion relation by the computer system, the increment quantity corresponding to an alternate quantity in the alternative unit of measure;
if the increment quantity cannot be represented precisely within the storage length allocated for the conversion relation, adjust the increment quantity and the conversion relation by:
calculate a plurality of approximations for the increment quantity in the alternative unit of measure whose degree of precision can be represented within the storage length;
for each approximation:
adjust the approximation according to a reference increment quantity,
calculate an approximate adjusted conversion relation according to the adjusted approximation, and
determine a relative error between the conversion relation and the approximate adjusted conversion relation; and

storing the adjusted conversion relation that is associated with the lowest relative error for use in conversion of quantities from the based unit of measure and the alternative unit of measure.

15. The method of claim 14, wherein the instructions further cause the executing device, in response to an input quantity expressed in the alternative unit of measure, to convert the input quantity to a nearest corresponding increment quantity based on the adjusted conversion relation.

16. The method of claim 14, wherein the instructions further cause the executing device to: receive input data at a computer system for quantities in the base unit of measure, and round the input data to nearest multiples of the increment quantity.

17. The method of claim 14, wherein the instructions further cause the executing device to: receive input data at a computer system for quantities in the alternative unit of measure,

convert the input data to quantities in the base unit of measure according to the adjusted conversion relation,

round the converted input data to nearest multiples of the increment quantity, and store the rounded input data in memory.

18. A method for product planning using a computer system, comprising:

determine an increment quantity for a base unit of measure based on a conversion relation between a base unit and an alternative unit and based on a degree of precision for storage and a length of the conversion relation, the increment quantity being the smallest quantity to be used by the system as a base increment in quantifying a product, the degree of precision for storage being the number of decimal places allocated to store quantities by the system and the length of conversion relation being the number of digits allocated by the system to store conversion relation; and

adjust the conversion relation with respect to the increment quantity.

19. The method of claim 18, further comprising storing the increment quantity and the adjusted conversion relation for use in conversion of quantities from the based unit of measure and the alternative unit of measure.

20. The method of claim 18, further comprising, adjusting an input value to a multiple of the increment quantity using the adjusted conversion relation.

21. The method of claim 20, wherein, if the input value received at a computer system is a quantity in the base unit of measure, the input value is adjusted by:

converting the input data to quantities in the base unit of measure according to the adjusted conversion relation,

rounding the converted input data to nearest multiples of the increment quantity, and
storing the rounded input data in memory.

22. The method of claim 20, wherein, if the input value received at a computer system is a quantity in the alternative unit of measure, rounding the input data to nearest multiples of the increment quantity.

23. The method of claim 18, wherein the base unit and the alternative unit are of different dimensions.

24. The method of claim 18, wherein the reference unit and the base unit are of the same dimension.

25. The method of claim 18, wherein, if the increment quantity can be represented precisely within storage space limited by the length of conversion relation, the conversion relation is adjusted by:

determining an approximated increment quantity from the increment quantity and the degree of precision for storage;

determining an approximated quantity in the alternative unit of measure from the increment quantity and the conversion relation; and

adjusting the conversion relation by rounding the approximated mated quantity in the alternative unit of measure to a nearest integer.

26. The method of claim 18, wherein, if the increment quantity cannot be represented precisely within storage space limited by the length of conversion relation, the conversion relation is adjusted by:

calculating a plurality of approximations for the quantity in the alternative unit of measure that can be represented within the storage length;

for each approximation:
adjusting the approximation to correspond to a reference increment quantity,
calculating an approximate conversion relation according to the adjusted approximation,
and
determining a relative error between the conversion relation and the approximate conversion relation; and
wherein the conversion relation is adjusted to the approximate conversion relation that is associated with the lowest relative error.

27. The method of claim 26, wherein the reference increment quantity is determined by calculating a least common multiple of a first quantity and a second quantity, wherein:

the first quantity is a quantity in the alternative unit of measure,
the second quantity is a quantity in a new alternative unit of measure, wherein the second quantity is derived from a second conversion relation between the alternative unit of measure and the new alternative unit of measure, wherein the alternative unit of measure and the new alternative unit of measure are of the same dimension.

28. The method of claim 26, wherein the reference increment quantity is determined by calculating a least common multiple of a first quantity, a second quantity, and a third quantity, wherein:

the first quantity is a quantity in the alternative unit of measure,
the second quantity is a quantity in a second alternative unit of measure, wherein the second quantity is derived from a second conversion relation between the alternative unit of measure and the second alternative unit of measure,

the third quantity is a quantity in a third alternative unit of measure, wherein the third quantity is derived from a third conversion relation between the alternative unit of measure and the third alternative unit of measure, wherein the alternative unit of measure, the second alternative unit of measure, and the third alternative unit of measure are of the same dimension.